

# NASA TECH BRIEF



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## Thermal Radiation Shields for Piping in Vacuum Environments

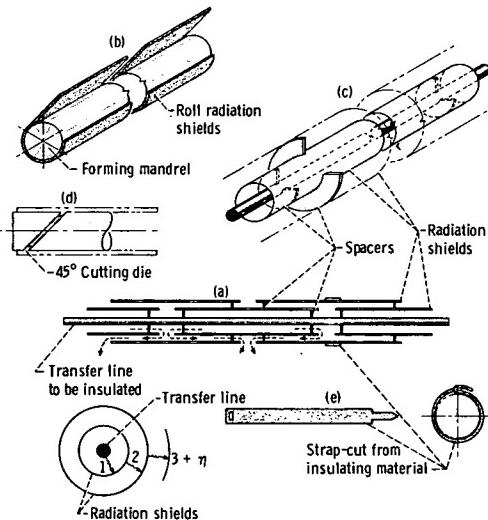


Figure 1. - Radiation shields for a transfer line.

Many vacuum installations contain piping which carries working fluids. Frequently, such piping must be insulated to reduce radiant heat transfer between the piping and the surrounding vacuum environment. A system of thermal radiation shielding has been devised, which is inexpensive and easy to fabricate and which can be quickly installed or removed, expedites efficient removal of entrapped gases, adapts easily to very small pipings, and can be reused many times.

Thin polished sheets of metal, preferably metal with a low emissivity, are rolled over a mandrel to the desired diameter, allowing some circumferential overlap (Figure 1b). Spacers of any suitable material are fabricated to the proper diameter (Figure 1c). Approximately 1/4 of each spacer ( $90^\circ$ ) is cut away to allow installation of the spacer and to permit gas

trapped between adjacent spacers to escape along the tube during pumpdown of the chamber. Spacers are installed on the piping and the rolled metal sheets are installed over the spacers. A gap of an inch or so is provided between the ends of adjacent sheets to allow gas escape. Successive layers of spacers and shields can be installed as required (Figure 1a). Gaps are staggered from one layer to the next. The outermost layer is held together by straps made from the same material as the shields (Figure 1e). The ends of the radiation shields can be mitred to make any necessary bends (Figure 1d).

These radiation shields can be easily removed simply by removing the straps from the outermost layer and slipping off the shields and spacers. They may be reused many times.

(continued overleaf)

**Notes:**

1. No further documentation is available.
2. Technical questions may be directed to:  
Technology Utilization Officer  
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21000 Brookpark Road  
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Reference: B69-10262

**Patent status:**

No patent action is contemplated by NASA.

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